Solar Solutions

- Solar Energy is Free
  - It only costs money to harvest it.

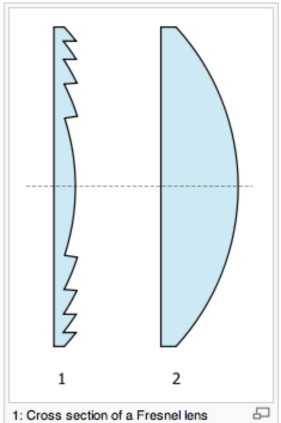
- Solar Energy forms - Heat and/or Electricity
  - Heat (Air and Water) Electricity (Photovoltaic)

Solar Solutions

Hot Water, Electricity, and Wind

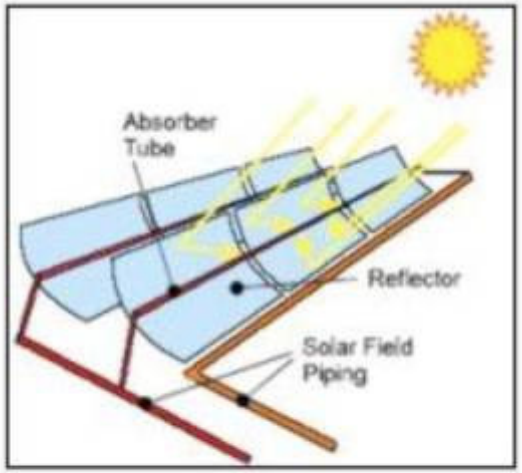
Solar Water Heating

- Future Techniques
  - Fresnel Lens focus
  - Parabolic focus



1: Cross section of a Fresnel lens
2: Cross section of a conventional plano-convex lens of equivalent power

Close-up of a lighthouse lens



Sketch of a Parabolic Trough Collector

- Commercially Ready
  - Flat panel collectors
  - Evacuated Tubes

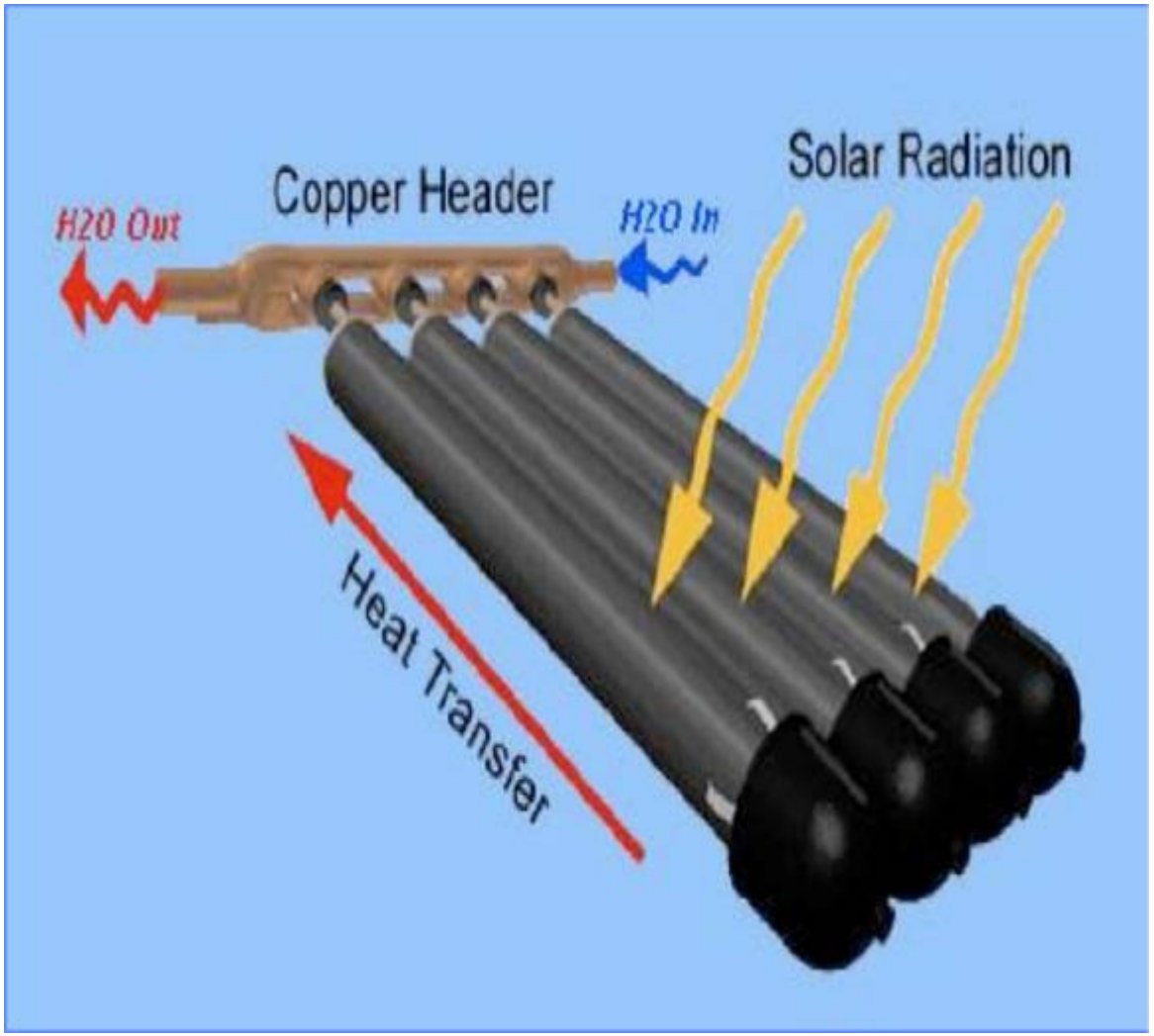
Commercial/Residential BTU - calculator

Step #1 **Gallons of Hot Water used per Day**

number living in household	4	
Total loads of laundry per week	7	
Automatic dishwasher? (yes/no)	Yes	
	liberal estimate	*conservative estimate*
showers	48	36
hand/face washing	6	6
food preparation	12	12
dishwashing by hand	0	0
automatic dishwashing	8	8
clothes washing	6.0	6.0
Total gallons of hot H2O used per day	80 gal/day	68 gal/day

Step #2 **Daily BTU Requirements**

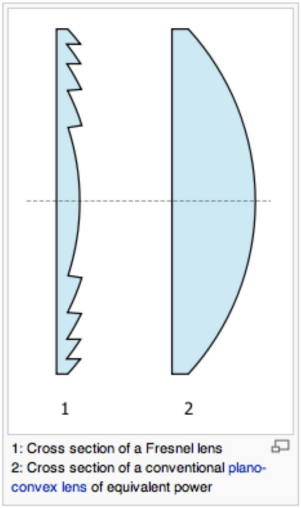
Avg summer insolation level for your area	1597					
Desired temperature gain	70					
	liberal estimate			*conservative estimate*		
Total heat load required	46,648 Btu/day			39,651 Btu/day		
	AP30	AP22	AP10	AP30	AP22	AP10
BTU Output Apricus collector / drainback	27,948	20,494	9,316	27,948	20,494	9,316
BTU Output Apricus collector / anti-freeze	23,755	17,420	7,919	23,755	17,420	7,919
# of collectors / drainback	1.67	2.28	5.01	1.42	1.93	4.26
# of collectors / anti-freeze	1.96	2.68	5.89	1.67	2.28	5.01


H2O Out
Copper Header
H2O In
Solar Radiation
Heat Transfer

Flat Panel Solar Hot Water

Multiple Rows

Fresnel Lens Focus



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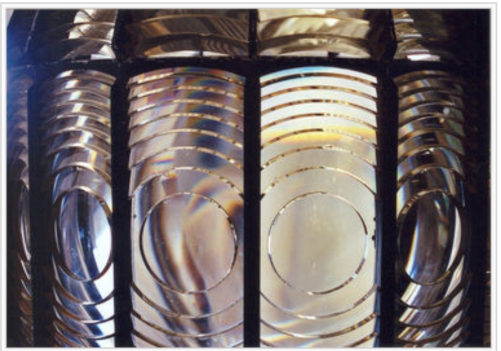
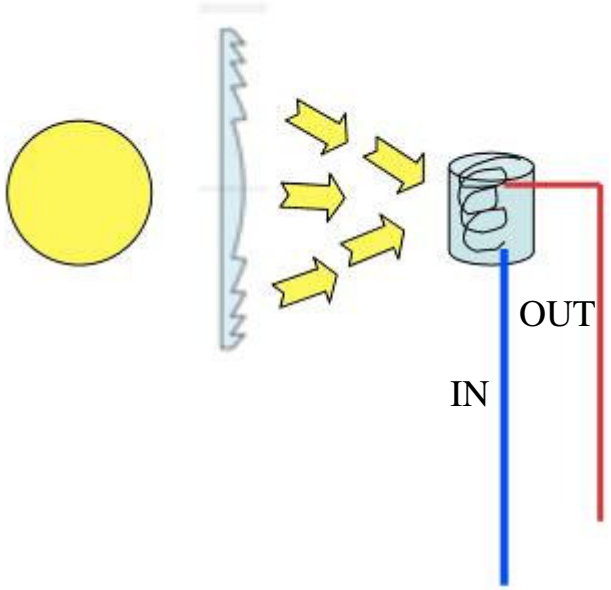
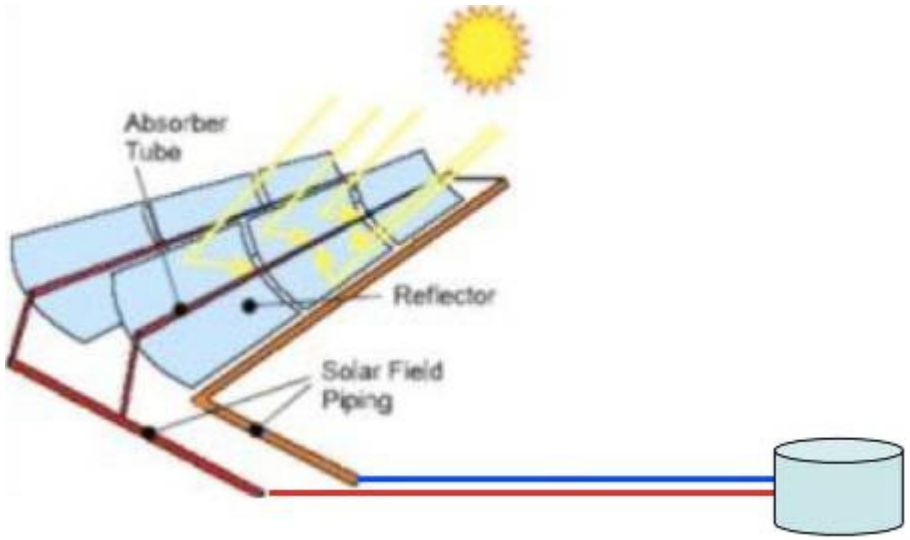


Close-up of a lighthouse lens

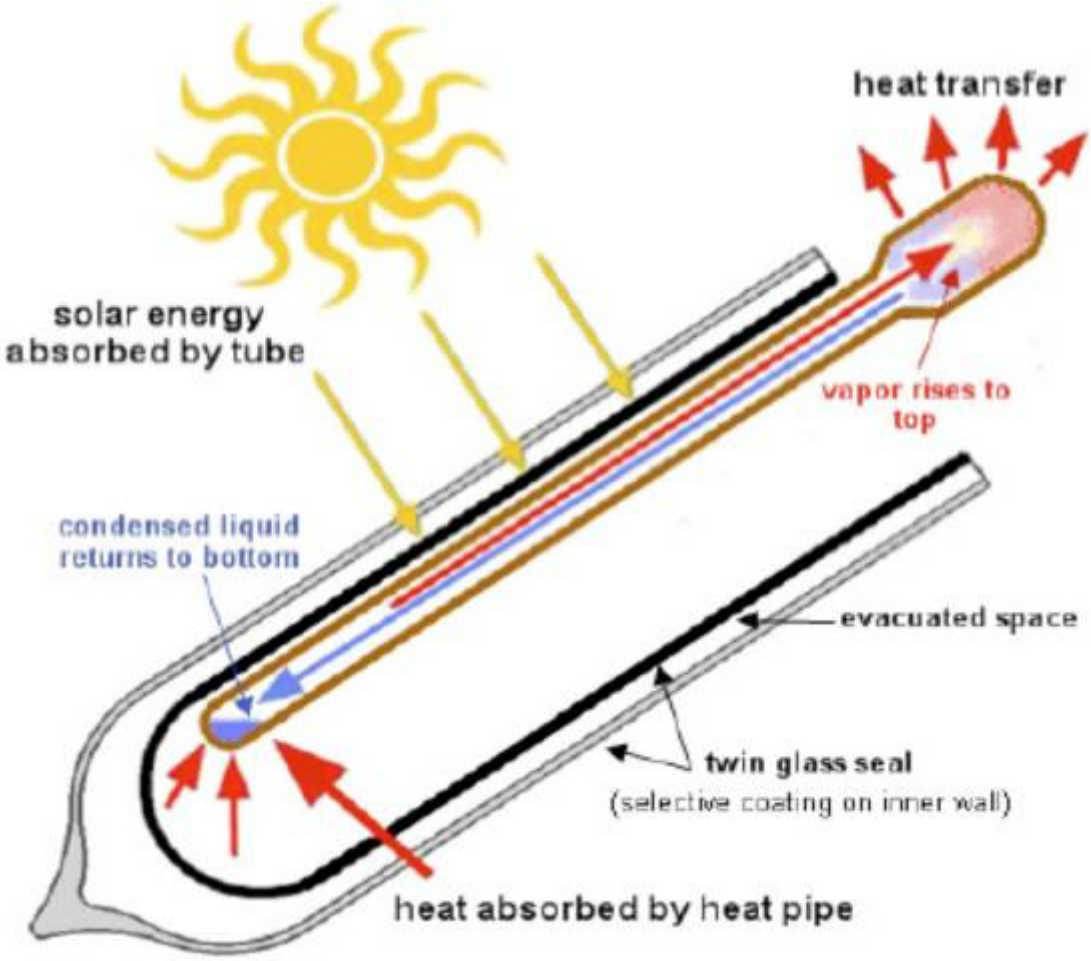


Parabolic Reflector

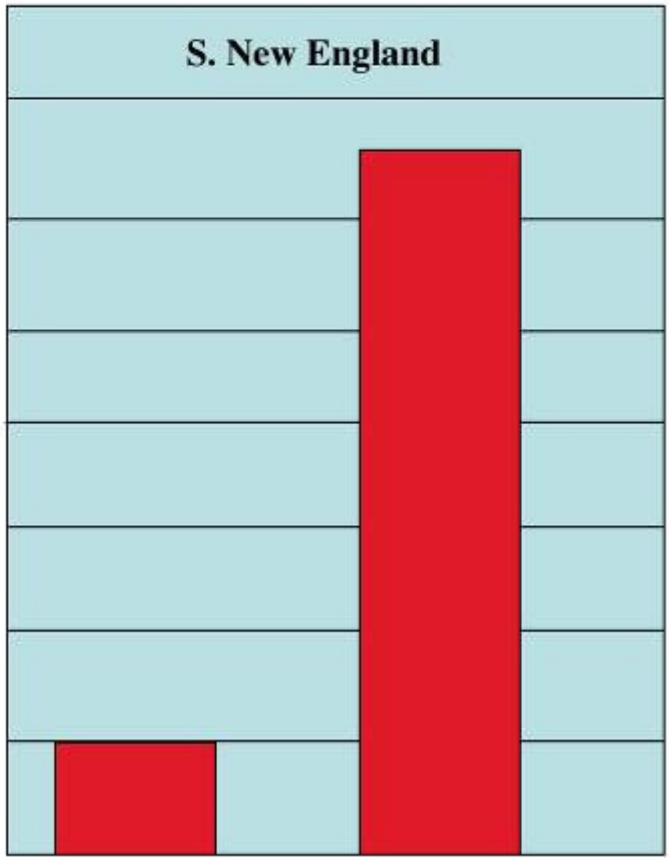


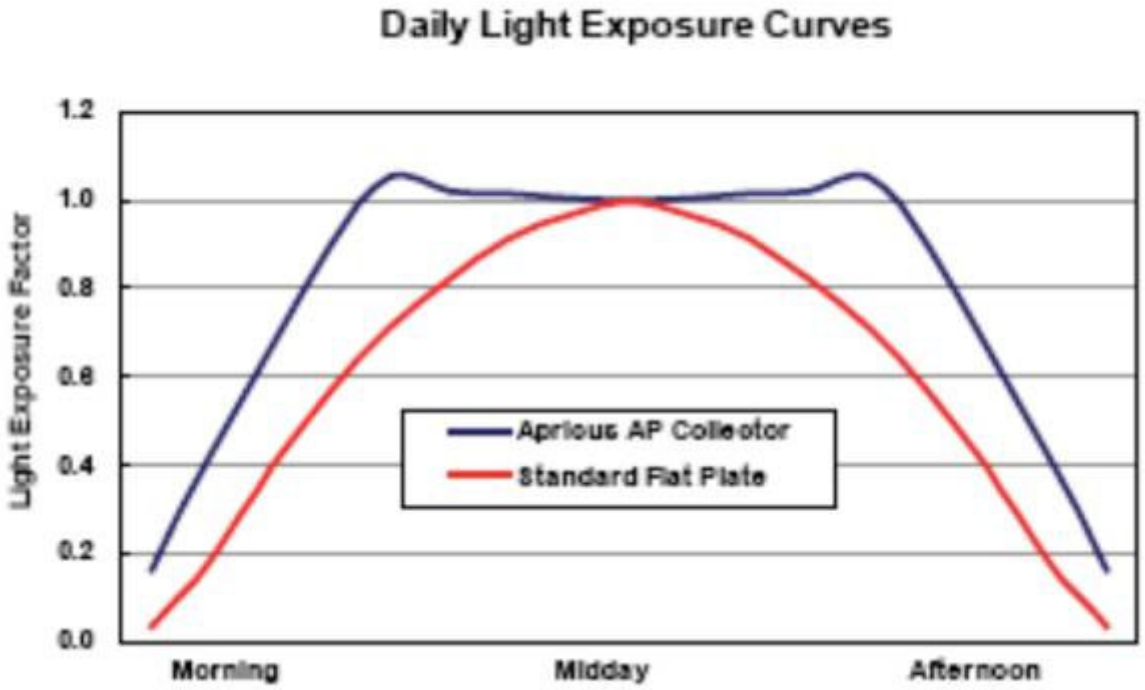
Heat Exchange/Rates
Storage Medium
Distribution
Backup Systems

Evacuated Tube Collectors



Solar water heating vs..
solar electric (pV) systems
Per sq.ft. of collectors




Daily Light Exposure Curves
Light Exposure Factor
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Morning
Midday
Afternoon
Aprious AP Collector
Standard Flat Plate

Which is greener: A Prius or a solar energy system?

- Based on dollars invested, a solar water heating system provides a better return than a Prius or a solar electric system.

SUNSEARCH NEWS 2007

Prius vs. Solar hot water

- Trade in an SUV or Pick-up getting 15MPG to a Prius getting 47MPG
- Typical Prius about $25,000
- Driving 12,000 miles year equates to 547 gallons saved @ 2.50 = $1,368 yr.
- New solar hot water system $8 to $12K
- Less tax credits $5 to $9K
- Typical savings about 4,800 kW-hrs/yr@ .15= $720.

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